DEPARTMENT OF HEALTH SERVICES

DHS

ENVIRONMENTAL MANAGEMENT BRANCH

STUDY GUIDE FOR THE REGISTERED ENVIRONMENTAL HEALTH SPECIALIST EXAMINATION

Introduction

This study guide has been designed to help you prepare for the Registered Environmental Health Specialist written examination prepared by Cooperative Personnel Services (CPS), a governmental testing agency. The words *exam* and *examination* are considered the same throughout the guide as are the words *questions* and *items*.

Your formal study, training, and experience in environmental health should have provided you with the knowledge and skills you need to pass the examination. However, we suggest that you also study the information given here about the examination process and content.

In addition to information about the examination process, this guide includes the following:

- Passing Score Information
- General Test Preparation Information and Strategies for Taking Written Examinations
- Examination Content Overview
- Sample Test Questions

If you have any questions regarding your application or this examination, you may contact the Department of Health Services at the following address:

Department of Health Services
Environmental Management Branch
Environmental Health Specialist Registration Program
MS 7404
P.O. Box 997413
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Passing Score Information

Since each test administration contains a different set of test questions, a criterion-referenced approach (Angoff probabilities) is used for setting the passing score on the exam. This approach involves setting the passing score on the basis of minimum standards for competent practice (i.e., job requirements) rather than relative candidate performance. Standards are consistently applied regardless of the form of the exam administered or the ability level of the candidate group. One important advantage of the criterion-referenced approach is that the passing score may be lowered for a hard examination and increased for an easy examination thus providing safeguards for both the candidate and the public. The criterion-referenced approach to setting passing scores is commonly used in certification examinations.

General Test Preparation Information

Following is information to help you study for the written examination for the State of California Environmental Health Specialist Certification.

- Do some work every day in preparation for the examination. Budget your time; set aside a definite study period for each day. Begin concentrating as soon as you sit down to study.
- Study by yourself and with others to encourage an exchange of ideas. Your study should focus on content areas listed in this syllabus. *It is not an advisable study technique for candidates to memorize large groups of test questions for the certification test process.* A large computerized item

bank has been created to generate different test forms on a regular basis.

- The focus of your study should be on knowledge and skills relevant to a newly certified Environmental Health Specialist.

- Develop your own illustrations and examples to check on your understanding of a topic. Make sure you fully understand the basic terms for each content area. Create your own glossary of terms and look up any new words in a reference book.

- The test will contain items at various levels of cognitive ability. Consequently, it is important to be able to understand, apply, and analyze the material as you would on the job. Although all questions will be in a multiple-choice format, the items will be presented in a number of forms. For example, a written scenario may be followed by a series of three or four questions.

- Some test takers are anxious about taking tests and need to simulate the test taking situation. If this is true for you, you may want to give yourself actual practice in a quiet, distraction-free environment.

General Strategies for Taking Written Tests

The basic format for this test is the multiple-choice format with four distinct choices. Here are some general hints for taking this type of test:

- Most importantly, the test is designed to have *only one answer that is best from among the four choices given*.

- Your attitude about the test process can make a difference. Approach the test confidently. Arrive in plenty of time for the test so you do not feel rushed.

- Be certain that you understand how to correctly use the computer scannable answer sheet. Make sure you are careful to make clean erasures on your answer sheet and to only mark one correct answer per test item.

- Proctor instructions read to you are very important, so be sure to listen carefully. There may be helpful clues given during the proctor instructions. Ask questions if there is something you do not understand about the instructions, but be aware that your proctor cannot answer questions about test content issues.

- Read all directions carefully, twice if necessary.

- Your score on this test will be based only on the number of correct choices you make (the number of times you select the best choice from the four given). All test items are equally weighted even though there are different weights for specific sections of the test. You may guess on questions you are not sure of as you go through the test. Mark them in your booklet for further consideration if you have time after you finish the entire test. Remember, this test does not penalize you for incorrect answers or guessing.

- Read each question carefully, making sure that you understand it before you answer. Reread it if necessary, but do not waste time on questions that seem too unfamiliar or difficult. Interpret words according to their generally accepted meanings. Rephrase or underline key words in difficult questions. No question is intended to be a "trick" or "catch" question.

- Answer the easy questions first; postpone more difficult questions until later, making an initial guess in case you do not have enough time to go back to it. Check your answers if you do have time, but remember that often your first response is correct.

- Watch your time carefully during the test.

- If you find a question you believe may be incorrect, you can comment on the calculation sheet provided. Include why you believe the question may be incorrect. This must be done during the allotted time for each examination book. Subject matter experts and occupational testing specialists will carefully review all comments. Together, they review this information and often find that the candidate has just missed the point of the item. Try to focus on doing well on many items on the test rather than getting bogged down on "making your case" on just one item that counts as one point. CPS uses extensive quality control measures to ensure a flawless test, including panel reviews by qualified subject matter experts in your field, in addition to state-of-the-art computerized scoring and item analysis techniques.

Examination Content Overview

The examination covers a wide range of environmental health topics. Below the most, mid-level, and least important environmental health areas are listed. The next section provides information on the specific knowledge, skills, and abilities covered by the test. The interrelated nature of the environmental health knowledge, skills, and abilities means that many questions will relate to more than one topic. The examination contains 260 questions. For administration purposes the 260 questions are split into two booklets—each comprised of 130 questions.

- Most Important Environmental Health Program Areas:
  - Food and Consumer Protection
  - Water Quality Management

- Mid-Level Important Environmental Health Program Areas (*not in any order of importance*):
  - Housing (Shelter)
  - Land Use
  - Recreational Areas and Bathing Facilities
  - Hazardous Materials and Waste Management
  - Solid Waste and Medical Waste Management
  - Pests and Vectors
  - Liquid Waste Management
  - Disaster Sanitation
  - Occupational and Public Health and Safety

- Least Important Environmental Health Program Areas:
  - Air Quality
  - Noise Control
  - Radiation Protection

Detailed Content Categories

A detailed description of each environmental health program area follows. Each section begins with a brief description of the program area. The specific content areas should be interpreted broadly. For example, "knowledge of water reclamation," might have questions relating to process, regulations, guidelines, protocol, or generally accepted practices.

1. GENERAL ENVIRONMENTAL HEALTH
This section is comprised of 60 questions covering knowledge, skills, and abilities that are common to all program areas. Major knowledge, skill, and ability areas include:

- Knowledge of environmental epidemiology
- Knowledge of general environmental sampling and testing techniques (random)
- Knowledge of risk assessment, management, and communications
- Knowledge of safe sampling collection procedures
- Knowledge of sampling, personal protection equipment, and procedures
- Knowledge of mathematics including addition, subtraction, multiplication, division, decimals, ratios, proportions, measurements, algebra, and geometry
- Knowledge of administrative actions (formal and informal authority), jurisdiction, and structure of environmental health agencies (federal, state, local, and regional)
- Knowledge of basic legal terminology
- Knowledge of ethical practices
- Knowledge of law and public policy law on inspections (code requirements, methods of lawful inspections, permits, licensing and registration regulations, embargo, seizure, condemnation, and nuisance abatement)
- Knowledge of legal methods to obtain information from regulated activities
- Knowledge of major environmental health laws (state, federal, and international)
- Knowledge of applying epidemiological data to the need for control measures
- Skill in gathering evidence (photographs, samples, test results)
- Skill in making inspections
- Skill in plan checking
- Skill in using epidemiology and vital statistics to identify causative factor and mode of occurrence
- Skill in interpreting graphs, charts, and tables
- Skill in interpreting laboratory data

2. FOOD AND CONSUMER PROTECTION
To assure safe and wholesome food, food products, and food establishments wherever food is produced, processed, distributed, transported, or served. Major knowledge, skill, and ability areas include:

- Knowledge of Hazard Analysis Critical Control Points (HACCP)
- Knowledge of acute and chronic disease causation
- Knowledge of the biological factors of bacteria and viruses
- Knowledge of chemical contaminants
- Knowledge of environmental health sampling, testing methods, and instruments
- Knowledge of epidemiology
- Knowledge of etiological agents, infectious agents, and resultant diseases

- Knowledge of interrelatedness of multiple environmental factors in disease causation
- Knowledge of labeling
- Knowledge of microbiology
- Knowledge of environmental factors and epidemiology
- Knowledge of modes of disease transmission
- Knowledge of toxicological modes of action
- Skill in applying food histories to assist in agent identification
- Skill in applying incubation periods to assist in agent identification
- Skill in applying symptomatologies to assist in agent identification
- Skill in calculating attack rates/morbidity rates
- Skill in constructing an epidemic curve to determine average onset time
- Skill in interpreting all data to identify agent and transmission mode
- Skill in reviewing construction plans
- Skill in utilizing appropriate epidemiological methods

3. WATER QUALITY MANAGEMENT

To restore or maintain the quality of water resources by the treatment or prevention of polluted water and to assure the provision and maintenance of water supplies which are safe and adequate in quantity and quality. Major knowledge, skill, and ability areas include:

- Knowledge of control and disease prevention measures
- Knowledge of epidemiology
- Knowledge of field water sampling instruments and methods
- Knowledge of laboratory vector sampling and testing instruments and methods
- Knowledge of water quality standards
- Knowledge of water reclamation
- Knowledge of water supply
- Knowledge of well construction/destruction
- Knowledge of the Safe Drinking Water Act
- Skill in applying symptomatologies to assist in agent identification
- Skill in interpreting all data to identify agent and transmission mode
- Skill in utilizing appropriate epidemiological methods

4. HOUSING (SHELTER)

To assure adequate, safe, and healthful housing for all persons whether in a home or an institutional setting. Major knowledge, skill, and ability areas include:

- Knowledge of acute and chronic disease causation
- Knowledge of environmental factors and epidemiology
- Knowledge of agent factors, etiological agents, and resultant diseases
- Knowledge of housing safety
- Knowledge of interrelatedness of multiple environmental factors in disease causation
- Knowledge of lead poisoning programs
- Knowledge of maintenance, occupancy, and structural standards
- Knowledge of the biological factors of viruses
- Knowledge of biological factors of bacteria
- Knowledge of the modes of disease transmission
- Knowledge of toxicological modes of action

5. LAND USE

To assure that land resources are planned and developed in such a manner that will mitigate or prevent health and safety problems for this and future generations. Major knowledge, skill, and ability areas include:

- Knowledge of environmental health principles such as water, liquid waste, noise, percolation, vectors, electromagnetic fields
- Knowledge of land use laws (CEQA, variances, use permits)
- Knowledge of soil science issues
- Knowledge of hydrogeology

6. RECREATIONAL AREAS AND BATHING FACILITIES

To assure that recreational and bathing facilities are designed and maintained so as to prevent health and safety problems. Major knowledge, skill, and ability areas include:

- Knowledge of acute and chronic disease causation
- Knowledge of construction criteria
- Knowledge of control and disease prevention measures
- Knowledge of sanitation issues for recreation areas and bathing facilities (especially spas and swimming pools)
- Knowledge of environmental factors and epidemiology
- Knowledge of modes of disease transmission
- Knowledge of toxicological mode of action
- Knowledge of water sampling techniques

7. HAZARDOUS MATERIALS AND WASTE MANAGEMENT

To assure protection of employees and the public by proper handling, treatment, storage, and disposal of hazardous materials and hazardous waste. Major knowledge, skill, and ability areas include:

- Knowledge of environmental health sampling, testing methods, and instruments
- Knowledge of chemical factors
- Knowledge of first response procedures
- Knowledge of groundwater hydrogeology (flows, impedance)
- Knowledge of hazardous materials storage principles
- Knowledge of hazardous waste management and minimization
- Knowledge of inorganic chemicals (alkali, earth, and transitional metals)
- Knowledge of organic chemicals (straight chain hydrocarbons, alicyclic hydrocarbons)
- Knowledge of other inorganic chemicals (nitrates, asbestos, fibrous glass, selenium)
- Knowledge of remediation and site cleanup
- Skill in applying symptomatologies to assist in agent identification
- Skill in interpreting all data to identify agent and transmission mode
- Skill in utilizing appropriate epidemiological methods

8. SOLID WASTE AND MEDICAL WASTE MANAGEMENT

To assure that all solid and medical wastes are managed so as not to create environmental or aesthetic problems. Major knowledge, skill, and ability areas include:

- Knowledge of acute and chronic disease causation
- Knowledge of control and disease prevention measures
- Knowledge of hazardous materials management
- Knowledge of landfill operations
- Knowledge of medical waste issues
- Knowledge of waste management and minimization
- Knowledge of integrated solid waste management
- Knowledge of medical waste management

9. PESTS AND VECTORS

To control pests and vectors which adversely affect human health and safety and the management of the public's exposure to pests and vectors. Major knowledge, skill, and ability areas include:

- Knowledge of acute and chronic disease causation
- Knowledge of control and disease prevention measures
- Knowledge of environmental factors and epidemiology
- Knowledge of etiological agents and resultant diseases
- Knowledge of general pesticide information
- Knowledge of the modes of disease transmission
- Knowledge of toxicological modes of action
- Knowledge of vector and reservoir sampling instruments and methods
- Knowledge of applying incubation periods to assist in agent identification
- Knowledge of applying symptomatologies to assist in agent identification and calculating attack rates/morbidity rates
- Knowledge of time-identifying vectors
- Skill in identifying pests
- Skill in interpreting all data to identify agent and transmission mode
- Skill in utilizing appropriate epidemiological methods

10. LIQUID WASTE MANAGEMENT

To assure the proper design, operation, and maintenance of waste water treatment systems in order to prevent contamination and disease transmission. Major knowledge, skill, and ability areas include:

- Knowledge of aerobic versus anaerobic principles
- Knowledge of control and disease prevention measures
- Knowledge of epidemiology
- Knowledge of on-site wastewater treatment
- Knowledge of percolation principles
- Knowledge of reclaimed water
- Knowledge of soil science
- Knowledge of water sampling techniques

11. DISASTER SANITATION
To assure the planning for and response to disasters. Major knowledge, skill, and ability areas include:

- Knowledge of control and disease prevention measures
- Knowledge of disaster response methods
- Knowledge of emergency/disaster conditions and sanitation issues (earthquakes, floods, riots)

12. OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY
To assure the positive health and safety of the public and workers in places of employment by controlling hazardous environmental factors. Major knowledge, skill, and ability areas include:

- Knowledge of accident prevention programs
- Knowledge of control and prevention
- Knowledge of epidemiology
- Knowledge of industrial hygiene
- Knowledge of occupational health factors

13. AIR QUALITY
To assure a community of an indoor and outdoor air resource conducive to positive human health which does not injure our environment and is aesthetically desirable. Major knowledge, skill, and ability areas include:

- Knowledge of dangerous gases (carbon monoxide, sulfur oxide, nitrogen oxide, oxidants)
- Knowledge of environmental health sampling and testing methods and instruments
- Knowledge of etiological agents, infectious agents, and resultant diseases
- Knowledge of indoor air pollutants (radon and asbestos)
- Knowledge of the modes of disease transmission
- Knowledge of toxicological modes of action

14. NOISE CONTROL
To prevent or protect the public from hazardous or annoying noise levels in residential, business, industrial, or recreational areas and structures. Major knowledge, skill, and ability areas include:

- Knowledge of general noise principles

15. RADIATION PROTECTION
To protect the public from the harmful effects of radiation. Major knowledge, skill, and ability areas include:

- Knowledge of ionizing radiation (harmful)
- Knowledge of the principles of radiation protection

Sample Questions

LEGAL AND AGENCY KNOWLEDGE

1. What is the legal term which describes the failure to perform an official duty as an Environmental Health Specialist without sufficient excuse?

   a. malfeasance
   b. misfeasance
   c. nonfeasance
   d. criminal responsibility

2. In the field of public health law, state government's police power is an attribute of a sovereign government; whereas, the federal government is a government of

   a. absolute police power.
   b. delegated police power.
   c. limited delegated powers.
   d. constitutional police power.

MATHEMATICS KNOWLEDGE

3. The Inverse Square Law is commonly used in which environmental health program areas to calculate the intensity or strength of a substance at a specified distance from the point source?

   a. radiation, lighting, and noise
   b. noise, air emissions, and radiation
   c. radiation, fluoridation in water, lighting, and noise
   d. lighting, sewage contamination in stream, and air emissions

4. If $15x + 3 = 7x - 13$, then x equals

   a. - 2.0
   b. +2.0
   c. +2.5
   d. +4.0

ENVIRONMENTAL EPIDEMIOLOGY

5. An epidemiological study which follows a group of people over time is a _____ study.

   a. regressive
   b. prospective
   c. progressive
   d. retrospective

SAFE SAMPLING COLLECTION PROCEDURES

6. A sample collected over a short time period where the atmospheric concentration is assumed to be consistent throughout the sample period is called a(an) _____ sample.

   a. grab
   b. small
   c. partial
   d. integrated

FOOD AND CONSUMER PROTECTION

7. Adequate cooking will <u>not</u> always prevent <u>Clostridium perfringens</u> food poisoning because

   a. the enterotoxin is heat stable.
   b. the spores are heat-resistant and may survive.
   c. it is a rapidly growing pyrophilic organism.
   d. incomplete heat distribution results in new bacterial colony formation.

WATER QUALITY MANAGEMENT

8. The level that a vacuum breaker must be installed above the flood rim of the fixture or receptacle it is serving is called the _____ level.

   a. installation
   b. anti-siphoned
   c. critical
   d. backflow

HOUSING (SHELTER)

9. The determination of overcrowding in residential units is based on the number of persons per

   a. bedroom.
   b. net square feet of habitable room.
   c. gross square feet of residential unit.
   d. cubic feet of airspace in dwelling unit.

LAND USE

10. Which situation best describes an incompatible land-use?

    a. One property is adversely impacted by the environmental pollutants generated on an adjacent parcel.
    b. The value of one property is greatly increased because of the presence of a more valuable land-use for nearby property or properties.
    c. The land-use allowed on one property adversely affects the health of the residents on an adjacent property.
    d. The land-use allowed on one parcel or property adversely impacts or restricts the use of an adjacent or nearby property or properties.

RECREATIONAL AREAS AND BATHING FACILITIES

11. Assuming a high-rate sand filter is operated at 15 gallons per minute per square foot, the minimum size filter needed for a 36,000-gallon swimming pool operating with a six hour turnover rate is _____ square feet.

    a. 6.67
    b. 12.72
    c. 23.33
    d. 40.01

HAZARDOUS MATERIALS AND WASTE MANAGEMENT

12. Pursuant to the California Right to Know Law, facilities that handle hazardous materials are primarily required to submit

    a. Material Safety Data Sheets.
    b. a business plan.
    c. a list of all hazardous materials.
    d. a list of all acutely hazardous materials.

SOLID WASTE AND MEDICAL WASTE MANAGEMENT

13. The Paint Filter Liquid Test is used at landfills to determine

    a. the soil permeability of cover material.
    b. the sludge content of incoming waste.
    c. if leachates have been formed.
    d. if wastes may be landfilled.

PESTS AND VECTORS

14. The causative agent of Weil's Disease resulting from direct or indirect contact with the infected urine of rodents and certain other animals is spp.

    a. Yersinia.
    b. Leptospira.
    c. Rickettsia.
    d. Wuchereria.

LIQUID WASTE MANAGEMENT

15. Which statement about hydraulic conductivity in soils is true?

    a. Hydraulic conductivity increases for all soils as they dry.
    b. Soils with small, discontinuous water-filled pores have high hydraulic conductivity.
    c. Unsaturated soils with large air-filled pores have a high hydraulic conductivity.
    d. As soils dry, the hydraulic conductivity of clay soils can become greater than that of sandy soils.

DISASTER SANITATION

16. In the event of a natural disaster, the safest source of drinking water would be from a(an)

    a. toilet tank.
    b. open cistern.
    c. water heater.
    d. swimming pool.

OCCUPATIONAL AND PUBLIC HEALTH AND SAFETY

17. The problems associated with pneumoconiosis are not heavily influenced by the

    a. rate of pressure rise.
    b. size of dust particles.
    c. length of particle exposure.
    d. concentration of airborne dusts.

AIR QUALITY

18. Inhalation of asbestos fibers may cause asbestosis,

    a. cancer, and mesothelioma.
    b. eye irritation, and skin rash.
    c. coughing, and pulmonary edema.
    d. lyphotheliomia, and sensitization.

RADIATION PROTECTION

19. Radon does not have the characteristic of

    a. being known to cause cancer.
    b. having a long half-life.
    c. having the ability to enter homes through a water well.
    d. occurring naturally in the soil.

NOISE CONTROL

20. Two identical pumps located side-by-side produce a sound level of 80 dBA at a distance of 10 feet. If one of the pumps is turned off, the sound level at 10 feet is _____ dBA.

    a. 40
    b. 70
    c. 77
    d. 80

ANSWER KEY

1	**C**
2	**C**
3	**A**
4	**A**
5	**B**
6	**A**
7	**B**
8	**C**
9	**B**
10	**D**
11	**A**
12	**B**
13	**D**
14	**B**
15	**D**
16	**C**
17	**A**
18	**A**
19	**B**
20	**C**

GOOD LUCK!